



Welcome to *Monitor* Issue 59



Nicky Gibbens
Manager, Personal Dosimetry
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Hello, and welcome to Issue 59 of *Monitor*, the twice-yearly newsletter of Public Health England's Personal Dosimetry Service (PDS).

I cannot believe just how rapidly the six months or so have flown by since the last issue of the newsletter

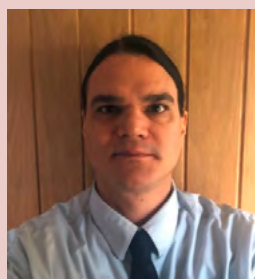
was published. Since the first lockdown, the pandemic worsened so that, like many of you, the second lockdown period presented unprecedented challenges. Now that the COVID-19 vaccination program is well underway and the scientific evidence is that it is really paying dividends, we are hopeful that we can all look forward to a sense of "normality", whatever normal looks like in the future.

In this issue, we have tried to include something of interest for all our customers outside the day-to-day world of personal dosimetry: -

- An introduction to and a big "hello" from Richard Burkett, our new PDS Dosimetry Manager
- Phil Gilvin, who some of you may know, has written an engaging piece about his ongoing work with EURADOS
- Rick Tanner has written a fascinating article about space weather, especially its impact on aircrew
- A short update as to the transition from Public Health England (PHE) to the new UK Health Security Agency (UKHSA)
- The publication of our new PDS UK Price List appears on the back page, along with our latest directory of PDS contacts

I trust that you find the articles in this issue of interest, and please let us know if, like other PDS customers, your organisation would be interested in submitting a small piece for publication in a future issue of *Monitor*.

PDS Welcomes Richard Burkett as its New Dosimetry Manager



Hello! My name is Richard Burkett and I am excited to be the new Dosimetry Manager of the Personal Dosimetry Service (PDS) here at Public Health England.

I was born and raised in New York State, but I moved to the UK in 2005 and have since started a family and have also become a British citizen. Although I am new to the role of PDS Dosimetry Manager, I am not new to PDS as an organisation. Over a decade or so ago, I worked as the Laboratories Supervisor and, whilst fulfilling that role, PHE enabled and encouraged me to obtain my MSc degree in Radiation & Environmental Protection. This led on to a new role as a Radiation Protection Advisor (RPA) whilst remaining within PHE.

During my time as an RPA, I provided commercial radiation protection services to a wide range of clients, assisting them in regulatory compliance and the implementation of effective safety management programmes for work with ionising radiations. This was achieved through consultations and site visits to customers' premises, undertaking radiation measurements and the creation of reports to provide findings and recommendations. I also lectured extensively on numerous radiation protection courses offered by PHE. Perhaps some of you have already seen me in action!

Coming back to PDS after all these years is, as I said, exciting. I have a deep understanding of the workings of the service, as well as understanding the demands and expectations of customers. I have experienced it from most angles: the technical side - within the Lab; the theoretical side - lecturing within the classroom; and the practical side - working with customers on the factory floor. I am proud of the Personal Dosimetry Service and to be an integral part of it. PDS is made up of fantastic people who ensure the continued great success and performance of the service. I plan not only to continue providing this level of excellence to our customers, but to continually investigate possible improvements in the future as well.

I look forward to meeting with as many PDS customers as possible in the future, either in virtual meetings or (who knows?) face-to-face too.

STOP PRESS! *Update on the transition from PHE*

As some of you will have seen in last autumn's issue of Monitor, government plans were put in place last August for the creation of a new National Institute for Health Protection (NIHP). It was anticipated that Personal Dosimetry Services would move across to the NIHP, with plans then being put in place to make the transfer as smooth as possible.

Note that, since then, the Prime Minister has decided on a new name for the agency we are working to create: the UK Health Security Agency (UKHSA), which replaces the NIHP working title. This new name recognises the critical role the agency will play in securing the nation's health and forming a permanent part of our national defence against global and domestic health hazards.

It is expected that the activities currently undertaken by the Centre for Radiation, Chemical and Environmental Hazards (CRCE) within PHE will transfer into the new UKHSA with effect from October 2021. Please be assured that this transition does not affect arrangements with stakeholders, who will be notified when the transition is complete and when the change of name comes into effect.

Please be assured that this transition does not affect arrangements with PDS customers; all contracts for services with and appointments of PHE in a radiation protection capacity will remain valid.

PHE Continues to Work with EURADOS



Dr. Phil Gilvin – Scientific/Technical Support Personal Dosimetry Services

Despite COVID we continue to be active in the work of the European Radiation Dosimetry Group.

The European Radiation Dosimetry Group, EURADOS ([see www.eurados.org](http://www.eurados.org)) is a network of approximately eighty European institutions and over six-hundred

scientists, aiming to promote technical quality and harmonisation of dosimetry across Europe. The institutions include public bodies like our own, together with universities and other research organisations. EURADOS is financially sponsored by several institutes, and pursues a variety of work, such as arranging intercomparisons, that is self-funding. As a voluntary network, EURADOS is independent from the European Union and includes members from non-EU countries such as Switzerland, Norway and, now, the UK.

The work of EURADOS includes the organisation of scientific meetings, training activities, intercomparisons and benchmark studies. In all areas, EURADOS seeks to publish its work in order to disseminate knowledge and best practice and achieves its aims through small Working Groups. Current areas of work include: -

- Harmonisation of individual monitoring for external radiation
- Environmental dosimetry
- Computational dosimetry
- Internal dosimetry
- Radiation dosimetry in radiotherapy
- Retrospective dosimetry
- High energy radiation fields
- Dosimetry in medical imaging

Colleagues from PHE's Centre for Radiation, Chemical & Environmental Hazards in Chilton are involved in several of these working groups. PDS staff are involved in the group on harmonisation of individual monitoring, which includes work on regular intercomparisons, technical training and quality assurance.

The COVID pandemic has affected many of the normal EURADOS meetings, especially the annual meeting held every February. However, EURADOS has continued to work remotely, with smaller meetings held by Teams and Zoom, with the recent general assembly and winter school held as webinars. EURADOS is also offering a webinar programme for radiation professionals.



EURADOS meetings like this (above) have had to move online.



Interested radiation professionals can find out more at the EURADOS website mentioned above, where they can also sign up for a newsletter. EURADOS is also active on social media.

EURADOS disseminates its work in its own reports (above left) as well as in open literature

Severe Space Weather – Could It Affect You?

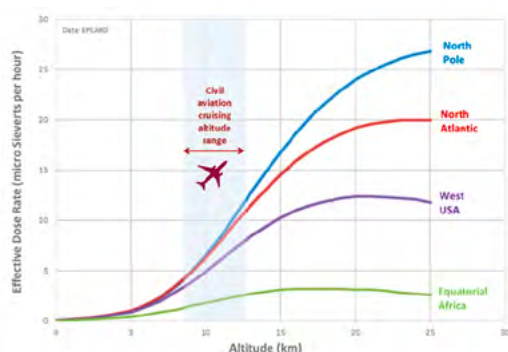


Dr. Rick Tanner
Senior Scientific Group Leader
Radiation Metrology Group, PHE

We are all aware of the legal requirements for personal dosimetry to protect workers who are exposed to ionising radiation. Most workers who wear PHE dosimeters receive very low doses because of good

practice in the workplace, although doses as low as 100 μSv can cause alarm - but which workers receive the highest doses? In routine operation, this is likely to be interventional radiologists or those working in high radon workplaces, both of which cover relatively few people. Perhaps it is more pertinent to ask which group of workers receive the most significant exposures? The reader may be surprised to find out that this is aircrew – long haul aircrew typically receiving a cosmic radiation dose of 6 mSv in a year, and there are a lot of them in normal flying times. These aircrew account for 70-80% of all occupational exposure.

So, what sort of personal dosimeters do they wear and why did you not notice them when you last flew? You may be surprised to find that they don't have to wear personal dosimeters, because their doses can be estimated based on knowledge of the routes flown. These routine doses can be up to 70 μSv for a return trip to California, though the dose rates depend a lot on altitude and latitude. Integrated over a normal year's flying, this can easily cause aircrew to receive 4-6 mSv every year of their working lives.



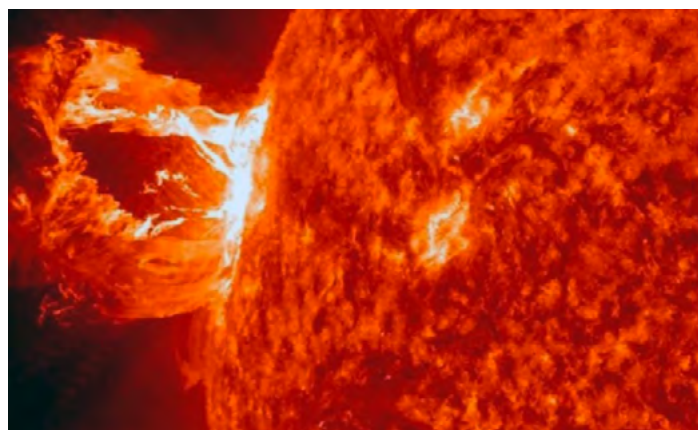
Dose rates versus altitude for different locations in the Earth's atmosphere, calculated using EPCARD (a program that calculates radiation exposure of aircrew)

As a passenger, one is likely to indulge in fewer flying hours than aircrew, so your personal risk is much lower - but is this as bad as it can get? *Not if you are unlucky.* Severe space weather is rated one of the most significant hazards on the UK's National Risk Register – one of those events, like pandemics, that have serious consequences, but happen rarely and are hard to predict.

The events of concern are major eruptions in the corona of the Sun (Coronal Mass Ejections – CMEs). These are caused by the complex magnetic fields that surround large groups of sunspots. When these erupt, huge amounts of solar material can be ejected into

space. This material is not especially threatening, but it is accompanied by an intense magnetic storm that, though travelling at potentially thousands of kilometres per hour, will take at least 12 hours to reach the Earth. It can have major impacts on modern technology, knocking out satellites and radio communications, but most significantly it could cause parts of the electricity grid to fail. There could be loss of GPS location, which would affect navigation and timing severely. Whilst most of the societal risk is connected to the CME impact, there are other risks connected to radiation exposures.

As the CME is generated, there is also a huge accompanying emission of X-rays and protons. The protons can cause intense radiation in the Earth's atmosphere about 20 minutes later, which for extreme events can be detected at ground level, though the risk to people on the ground is negligible. Huge and very sensitive detectors are required to measure the radiation but can still only detect the largest events.



An eruption on the surface of the Sun, emitting a coronal mass ejection at speeds of thousands of kms/s but, unseen in the image, intense radiation fields are emitted with the protons reaching the Earth in about 20 minutes.

Higher in the atmosphere, however, the dose rates can be significantly raised. These huge events happen only every 100 to 150 years, but it is calculated that a reasonable worst-case scenario could deliver 30 mSv to passengers and crew on commercial aviation. This is far too low to cause acute effects, and to be caught in more than one of these in a lifetime would be exceedingly unlucky, but the radiation exposure would clearly cause concern for those that receive it.

Is that as bad as it can get? No, events in 774 AD and 993 AD caused such intense radiation in the Earth's atmosphere that raised carbon-14 levels can still be detected in tree rings from those years. The radiation dose to aircrew and passengers, if there had been any, could have been 100 times higher, perhaps as high as 300 mSv.

So, what are we doing to protect the public? CRCE is looking mainly at improved forecasting, the goal being to make major events and their effects more predictable. This would enable us to recommend flight paths be altered; to fly at lower altitude and/or latitude; perhaps delaying take off; landing at a different return destination to the airport departed from. However, it must be remembered that whilst the risks are real, they are also extremely unlikely to affect you.

Prices from April 2021

Listed below are PDS prices for dosimeters and associated services effective from 1st April 2021, which do not show any volume discounts at this stage. However, the prices shown do attract such discounts, with many of our existing customers paying less than these prices. For example, a client receiving four TLDs every four weeks (i.e. 52 per annum) would be priced as per the first discount band. Note also that discounts are calculated automatically by the PDS invoicing system, meaning these discounts need not be claimed.

Please contact PDS for volume-discount details.

DOSEMETER TYPE	WEAR PERIOD	PRICE (EA.)
TLD	2-weekly, 4-weekly & monthly*	£6.55
TLD	8-weekly & bi-monthly*	£7.30
TLD	12-weekly, 13-weekly & quarterly*	£8.30
Extremity Stall	All wear periods*	£8.75
Extremity Ring	All wear periods*	£10.05
PADC / Neutron	All wear periods*	£37.20

All prices apply to UK delivery addresses only and exclude VAT, which will be added to charges where applicable.

All goods supplied based on these prices are subject to PHE's standard Terms & Conditions of supply, available on request.

DOSEMETER TYPE	WEAR PERIOD	PRICE (EA.)
Quantity		
PADC / Radon	1 to 5 wearers	£100.00 - £200.00 p.a
All Wear Periods	6 to 250 wearers	£37.20
Unreturned TLDs	All wear periods	£24.00
Printed Reports	Per client site	£100.00
Dose Record Keeping using PHE Dosimeters	Initial registration fee covering a minimum of 12 months	£31.70
	Renewal fee for subsequent years NB: Price decreases with quantity	£18.75
Dose Record Keeping non-PHE Dosimeters	Initial registration fee covering a minimum of 12 months	£125.30
	Renewal fee for subsequent years NB: Price is regardless of quantity	£100.00
Special Entries to Dose Records	NB: The first two entries per year are free-of-charge	£8.50
Radiation Passbooks	Next-working-day despatch	£28.00
	Standard despatch	£17.55
* NB: Orders are subject to a minimum order charge of £60		

Stay connected with Personal Dosimetry Services (PDS)

Contact

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Dose Records Office (NB: All calls are rotated)	825230

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Laboratories: –

TLD & Extremity	825353
Neutron (Leeds)*	0113 267 9041

Customer Services (CS): –

CS Team (NB: All calls are rotated)	825240
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A SHORT REMINDER THAT, AS OF APRIL 1ST 2020, PDS "WENT PAPERLESS" TO IMPROVE SUSTAINABILITY AND LESSEN OUR ENVIRONMENTAL IMPACT. IF YOU HAVE OPTED TO STILL RECEIVE REPORTS IN PAPER FORM, A FLAT FEE OF £100 WILL BE PAYABLE ANNUALLY FROM JANUARY 1ST 2021.